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10/700,157	11/03/2003	Christopher J. Thompson	CTHO-2	3820

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Ansel M. Schwartz
Suite 304
201 N. Craig Street
Pittsburgh, PA 15213

EXAMINER	
LEE, SHUN K	

ART UNIT	PAPER NUMBER
2884	

DATE MAILED: 05/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary	Application No.	Applicant(s)	
	10/700,157	THOMPSON ET AL.	
	Examiner	Art Unit	
	Shun Lee	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 March 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings were received on 10 March 2006. These drawings are not acceptable. The drawings are objected to because original Figs. 5 and 6 are relabeled as Figs. 6 and 5, respectively (and does not appear to correspond to the description in the specification). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are also objected to as failing to comply with 37 CFR 1.84(p)(4) because:

(a) reference character "12" has been used to designate both patient section (*e.g.*, pg. 11, line 1) and inorganic scintillator (*e.g.*, pg. 17, line 7);

(b) reference character "14" has been used to designate both source (*e.g.*, pg. 8, line 10) and position (*e.g.*, pg. 14, line 1) and

(c) reference character "63" has been used to designate both piece (*e.g.*, pg. 9, line 13) and anode (*e.g.*, pg. 15, line 5).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are further objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 34. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if

only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by McCroskey *et al.* (US 5,841,140).

In regard to claim **1**, McCroskey *et al.* disclose (Fig. 12) a time alignment system for a scanner comprising:

(a) a radioactive source (120);

(b) means (head 1) of detecting, and producing a signal (*i.e.*, triggering timing signal H1) at the time of radioactive decay of the source (120); and

(c) means (73) of converting the signal (H1) into a common reference clock for calibration of the scanner (column 26, line 1 to column 28, line 50).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCroskey *et al.* (US 5,841,140) in view of Luitwieler *et al.* (US 4,060,726).

In regard to claim **2** which is dependent on claim 1, while McCroskey *et al.* also disclose (column 26, lines 8-13) that the radioactive source emits positrons, the system of McCroskey *et al.* lacks that the radioactive source has a half-life longer than six months. Luitwieler *et al.* teach (column 7, lines 7-10) to provide a radioactive source having a relatively long half-life, in order maintain constant counting statistics over the

expected lifetime of the associated instrument. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a radioactive source having a half-life longer than six months in the system of McCroskey *et al.*, in order to maintain constant counting statistics over the expected lifetime of the associated system.

In regard to claim **3** which is dependent on claim 2, the system of McCroskey *et al.* lacks that the radioactive source is surrounded by a medium capable of detecting when the source decays by positron emission and before the positron combines with an electron and they annihilate subsequently producing two gamma rays which may be detected by the scanner's detectors. However, McCroskey *et al.* also disclose (column 4, lines 46-53) that the positron emitting isotope is detected by a conventional scintillator coupled to a PMT. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to insert the positron emitting isotope into a scintillator coupled to a PMT in the system of McCroskey *et al.*, in order to detect when the source decays by positron emission.

In regard to claim **4** which is dependent on claim 3, McCroskey *et al.* also disclose (column 4, lines 46-53) that the medium is coupled to means of converting the detection into an electronic timing signal.

In regard to claim **5** which is dependent on claim 4, McCroskey *et al.* also disclose (column 26, line 1 to column 28, line 50) that the timing signal is used as a timing reference for the scanner's gamma ray detectors.

In regard to claim **6** which is dependent on claim 5, McCroskey *et al.* also disclose (column 26, line 1 to column 28, line 50) that the timing reference serves as a system clock during the timing alignment of all the detectors such that they may all aligned to this common reference clock.

In regard to claim **7** which is dependent on claim 6, McCroskey *et al.* also disclose (column 26, line 1 to column 28, line 50) that all the scanner's gamma ray detectors may be aligned simultaneously to the common system clock.

10. Claims 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCroskey *et al.* (US 5,841,140) in view of Luitwieler *et al.* (US 4,060,726) as applied to claim 7 above, and further in view of Hamill *et al.* (US 6,774,358).

In regard to claims **8-11** which are dependent on claim 7, the modified system of McCroskey *et al.* lacks that the source may remain stationary near the center of the scanner during the alignment procedure, and that the source includes a layer of a positron emitting isotope placed on an inner surface of a plastic scintillator cylinder comprised of two pieces which are fixed together. Hamill *et al.* teach (column 5, line 18 to column 6, line 46) to position a radioactive source within an attenuating cylindrical holder near the center of the scanner, in order to obtain similar count rates from all detectors. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to position a radioactive source as a layer within an attenuating (*e.g.*, two piece plastic scintillator) cylindrical holder near the center of the scanner in the modified system of McCroskey *et al.*, in order to obtain similar count rates from all detectors.

In regard to claims **12** and **13** which are dependent on claim 11, McCroskey *et al.* also disclose (column 4, lines 46-53) a photomultiplier coupled to the scintillator, wherein the photomultiplier has an anode output which produces the signal whose amplitude is proportional to the energy.

In regard to claim **14**, McCroskey *et al.* in view of Luitwieler *et al.* and Hamill *et al.* is applied as in claim 8 above.

Response to Arguments

11. Applicant's arguments filed 10 March 2006 have been fully considered but they are not persuasive.

Applicant argues (last two paragraphs on pg. 7 to first paragraph on pg. 8 of remarks filed 10 March 2006) that the present application is different than the McCroskey *et al.* patent by detecting positrons which are detectable before the gamma rays. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (*i.e.*, detecting positrons) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Independent claim 1 recites the limitation of a "means of detecting, and producing a signal at the time of radioactive decay of the source". The specification discloses (pg. 15, lines 15-18) that "The plastic scintillator,52, is coupled with optical cement to a fast photo-multiplier 64,the anode output 65, of which is used to identify the time precise time at which the parent nucleus decayed by positron emission". Thus,

detecting positrons is not disclosed in the specification, nor recited in independent claim 1. Therefore, a prior art scintillator optically coupled to a photomultiplier which identify the time at which the parent nucleus decayed by positron emission is within the scope of instant independent claim 1.

Applicant argues (second and third paragraphs on pg. 8 of remarks filed 10 March 2006) that McCroskey *et al.* cannot align all detectors to a common reference clock since the positron point source is then moved to the opposite head and a second reference crystal is used in the second step. Examiner respectfully disagrees. The specification discloses (pg. 6, lines 5-9) that "This invention "works" because positron decay is a two-step process. The new source detects the decay of the parent nucleus, and the scanner's conventional detectors detect the gamma rays which are the product of positron annihilation". Thus for each detector which detects a positron annihilation gamma ray, a reference time is determined from detection of the decay of the parent nucleus which produced that particular positron annihilation gamma ray. It is important to recognize that a reference time needs to be determined for each parent nucleus decay which produces a positron annihilation gamma ray which is detected. That is, detector A detects a positron annihilation gamma ray γ_A at time t_A from a decay of parent nucleus N_A with a determined reference time t_{A0}, detector B detects a positron annihilation gamma ray γ_B at time t_B from a decay of parent nucleus N_B with a determined reference time t_{B0}, detector C detects a positron annihilation gamma ray γ_C at time t_C from a decay of parent nucleus N_C with a determined reference time t_{C0}, etc.

Thus a common reference clock as disclosed in the specification is simply a set of reference times (*e.g.*, t_{A0}, t_{B0}, t_{C0}, etc.).

Applicant argues (last two paragraphs on pg. 8 of remarks filed 10 March 2006) that they are not detecting positrons in the McCroskey *et al.* patent and it would be more convenient to use F-18, but a longer lived isotope would work just as well. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (*i.e.*, detecting positrons) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant argues (second paragraph on pg. 9 of remarks filed 10 March 2006) that the timing signal is not used as a timing reference for all the scanner's detectors in the McCroskey *et al.* patent since the source is moved to at least one other position. Examiner respectfully disagrees. As discussed above, a common reference clock is simply a set of reference times (*e.g.*, t_{A0}, t_{B0}, t_{C0}, etc.). A set of reference times (*i.e.*, common reference clock) is used as a timing reference for all the scanner's detectors in the McCroskey *et al.* patent.

Applicant argues (third paragraph on pg. 9 of remarks filed 10 March 2006) that one cannot align all detectors to a common reference clock using the technique proposed in the McCroskey *et al.* patent. Examiner respectfully disagrees. As discussed above, a set of reference times (*i.e.*, common reference clock) is used as a timing reference for all the scanner's detectors in the McCroskey *et al.* patent.

Applicant argues (fourth paragraph on pg. 9 and first paragraph on pg. 10 of remarks filed 10 March 2006) that the way in which the gamma rays travel away from the point of positron annihilation makes it impossible to align the detectors simultaneously. Examiner respectfully disagrees. As discussed above, a set of reference times is used as a timing reference (*i.e.*, alignment of all the detectors simultaneously) for all the scanner's detectors in the McCroskey *et al.* patent.

Applicant argues (second and third paragraphs on pg. 10 of remarks filed 10 March 2006) that the purpose of the plastic is to detect the positrons as they slow down before they can combine with an electron and annihilate. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (*i.e.*, detecting positrons) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant argues (last two paragraphs on pg. 10 of remarks filed 10 March 2006) that the present application detects positrons. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (*i.e.*, detecting positrons) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SL

DAVID PORTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800